

Practical Task 1:

Fine-tune language models using as minimum one method: Portal, Python or REST

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dibrova-ai Azure OpenAI

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- Resource Management
 - Keys and Endpoint
 - Encryption
 - Pricing tier
 - Networking
 - Identity
 - Cost analysis
 - Properties
 - Locks
- Security
- Monitoring
- Automation
- Help

Status : Active

Location : East US

Subscription (move) : [Azure subscription 1](#)

Subscription ID : 9a6ae428-d8c3-44fe-bdf2-4e08593901a0

Tags (edit) : [Add tags](#)

Get Started **Develop** Monitor

Keys and endpoint

You will need your key, endpoint and service region to call the service. Select the 'Keys and Endpoint' tab on the left hand side to see more.

Show Keys

KEY 1

KEY 2

Location/Region

Endpoint

<https://dibrova-ai.openai.azure.com/>

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Deployments

gpt-4

Details Metrics Risks & Safety Consume

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Deployment info

Name	gpt-4	Provisioning state	Succeeded
Deployment type	Global Standard	Created on	2025-02-24T18:46:16.397422Z
Created by	VolodymyrDibrova@dmytroslotvinskyy@gmail.onmicrosoft.com	Modified on	Feb 24, 2025 8:46 PM
Modified by	VolodymyrDibrova@dmytroslotvinskyy@gmail.onmicrosoft.com	Version update policy	Once a new default version is available

Rate limit (Tokens per minute)	100 000	Rate limit (Requests per minute)	600
--------------------------------	---------	----------------------------------	-----

Model name	gpt-4	Model version	turbo-2024-04-09
Life cycle status		Date created	

Endpoint

Target URI

<https://dibrova-ai.openai.azure.com/>

Key

[2rQ2Xmu5WIVgjORt6gb0sNyj](#)

Monitoring & safety

Content filter

DefaultV2

Useful links for application

[Code sample repository](#)

[Tutorial](#)

```
app.py > --
1 import openai
2
3 openai.api_type = "azure"
4 openai.api_base = "https://dibrova-ai.openai.azure.com/"
5 openai.api_version = "2024-02-15-preview"
6 openai.api_key = "2rQ2Xmu5WIVgJORT6tgb0sNyjBBACyEjFXJ3w3AAAABACOG2IGI"
7
8 deployment_name = "gpt-4"
9
10 response = openai.ChatCompletion.create(
11     engine=deployment_name,
12     messages=[
13         {"role": "system", "content": "Ти - помічник, який надає корисні відповіді."},
14         {"role": "user", "content": "Привіт! Розкажи мені щось цікаве про GPT-4."}
15     ],
16     temperature=0.7,
17     max_tokens=200
18 )
19
20 print(response.choices[0].message["content"])
21
```

Однією з ключових особливостей GPT-4 є її покращена здатність розуміти та генерувати текст на основі значно більш

Practical Task 2: Created Azure AI

Microsoft Azure

Search resources, services, and docs (G+/I)

Home >

myAI1
Azure OpenAI

Search

Go to Azure AI Foundry portal

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Overview

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Diagnose and solve problems

Resource visualizer

Resource Management

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Help

Essentials

Resource group (move) : Volodymyr-Dibrova

Status : Active

Location : East US

Subscription (move) : Azure subscription 1

Subscription ID : 9a6ae428-d8c3-44fe-bdf2-4e08593901a0

Tags (edit) : Add tags

Get Started

Develop

Monitor

API Kind : OpenAI

Pricing tier : Standard

Endpoints : Click here

Manage keys : Click here

Build your own secure copilot and generative AI applications

Deploy an Azure OpenAI model and start making API calls. Connect your own data, or with Azure OpenAI language, image and speech models. You can access the service through a web-based interface in the Azure AI Foundry portal

Learn More

Explore and deploy

Explore and deploy the generative AI models, craft unique prompts for your use cases, and fine-tune select models.

Explore Azure AI Foundry portal

Created Search service

Microsoft Azure

Search resources, services, and docs (G+)

Home >

mysearchai1

Search service

Search

+ Add index Import data Import and vectorize data Search explorer Refresh Delete Move

Overview

Activity log

Access control (IAM)

Tags

Diagnose and solve problems

Resource visualizer

Search management

Settings

Monitoring

Automation

Help

Query rewriting is now available in semantic ranker for select regions. [Learn more](#)

Essentials

Resource group (move) : Volodymyr-Dibrova

Location (move) : Central US

Subscription (move) : Azure subscription 1

Subscription ID : 9a6ae428-d8c3-44fe-bdf2-4e08593901a0

Status : Running

Tags (edit) : Add tags

Get started

Properties

Usage

Monitoring

Revolut

Don't know when

Created and imported pdf files

Microsoft Azure

Search resources, services, and docs (G+)

Copilot

Home > Storage accounts > volodymyrstate011 | Containers >

margies-travel

Container

Search

Upload Change access level Refresh Delete Change tier Acquire lease Break lease View snapshots Create snapshot Give feedback

Overview

Diagnose and solve problems

Access Control (IAM)

Settings

Authentication method: Access key (Switch to Microsoft Entra user account)

Location: margies-travel

Search blobs by prefix (case-sensitive)

Show deleted blobs

Add filter

Name	Modified	Access tier	Archive status	Blob type
<input type="checkbox"/> Dubai Brochure.pdf	3/5/2025, 6:40:26 PM	Hot (Inferred)		Block blob
<input type="checkbox"/> Las Vegas Brochure.pdf	3/5/2025, 6:40:26 PM	Hot (Inferred)		Block blob
<input type="checkbox"/> London Brochure.pdf	3/5/2025, 6:40:26 PM	Hot (Inferred)		Block blob
<input type="checkbox"/> Margies Travel Company Info.pdf	3/5/2025, 6:40:26 PM	Hot (Inferred)		Block blob
<input type="checkbox"/> New York Brochure.pdf	3/5/2025, 6:40:26 PM	Hot (Inferred)		Block blob
<input type="checkbox"/> San Francisco Brochure.pdf	3/5/2025, 6:40:27 PM	Hot (Inferred)		Block blob

Created chatbots

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Azure OpenAI Service

Model deployments

Model deployments App deployments

+ Deploy model

Refresh

Edit

Delete

Open in playground

Reset view

Columns

Name	Model name	Model version	State	Model retirement date	Content filter	Deployment
gpt-35-turbo-16k	gpt-35-turbo-16k	0613	Succeeded	Apr 30, 2025 3:00 AM	DefaultV2	Standard
text-embedding-ada-002	text-embedding-ada-002	2	Succeeded	Oct 3, 2025 3:00 AM	DefaultV2	Standard

Created index for search AI

Microsoft Azure

Search resources, services, and docs (G+/I)

Home > mysearchai1 | Indexes >

vector-1741193328711 ...

Save Discard Refresh Create demo app Edit JSON Delete Encryption

Documents 6 Total storage 139.84 KB Vector index quota usage 109.37 KB Max storage 50 MB

Search explorer Fields CORS Scoring profiles Vector profiles

Query options View

Search

Results

1

Start and results

```
def main():
    # Get the prompt
    text = input("\nEnter a question:\n")

    # Configure your data source
    extension_config = {
        "dataSources": [
            {
                "type": "AzureCognitiveSearch",
                "parameters": {
                    "endpoint": azure_search_endpoint,
                    "key": azure_search_key,
                    "indexName": azure_search_index
                }
            }
        ]
    }
```

```
{
  "error": {
    "code": "",
    "message": "No index with the name 'margies-index' was found in the service 'mysearchai1'."
  }
}
```

PS E:\projects\terraform\Proj\DevopsService\AzureAI\mslearn-openai\Labfiles\06-use-own-data\python> python ownData.py

Enter a question:
Tell me about London

...Sending the following request to Azure OpenAI endpoint...
Request: Tell me about London

Response: London is the capital and most populous city of England and the United Kingdom [doc2]. It is situated on the River Thames in the southeast of Great Britain and has been a significant settlement for over two thousand years [doc2]. London's ancient core, known as the City of London, retains its medieval boundaries and is surrounded by Greater London, which is governed by the Mayor of London and the London Assembly [doc2]. London is renowned for its leisure, outdoor activities, historical sites, and arts and culture [doc2]. The best time to visit is from June to August, with an average temperature ranging from 56-67°F and an average precipitation of 1.9 inches [doc2]. Margie's Travel offers various accommodation options in London, including The Buckingham Hotel, The City Hotel, and The Kensington Hotel [doc2]. For more information, you can visit Margie's Travel website at www.margiestravel.com [doc1][doc2].

```
36 extension_config = {
37     "dataSources": [
38         {
39             "type": "AzureCognitiveSearch",
40             "parameters": {
41                 "endpoint": azure_search_endpoint,
42                 "key": azure_search_key,
43                 "indexName": azure_search_index
44             }
45         }
46     ]
47 }
```

Enter a question:
Las Vegas Hotels?

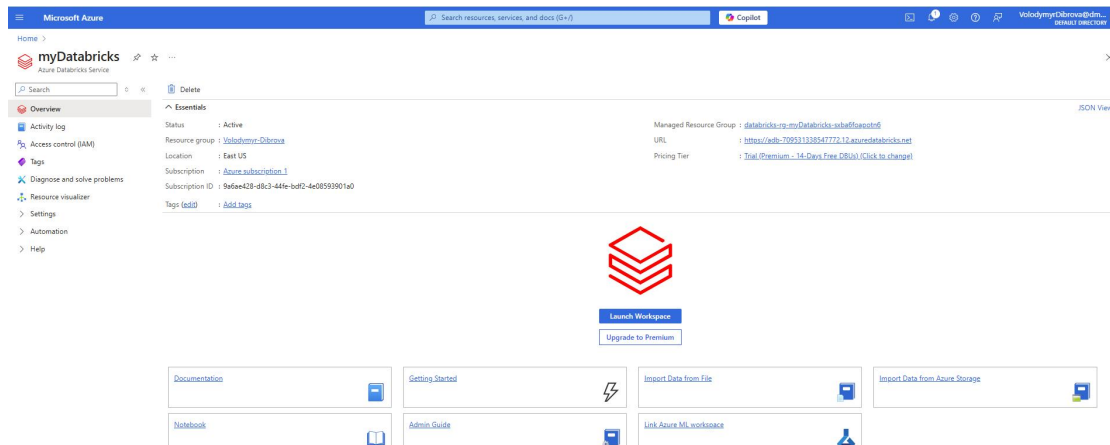
...Sending the following request to Azure OpenAI endpoint...
Request: Las Vegas Hotels?

Response: Here are some hotels in Las Vegas that Margie's Travel offers [doc1]:

1. The Volcano Hotel: Located in the heart of The Strip, this stylish casino hotel offers live entertainment and an extensive pool area.
2. The Fountain Hotel: Luxury accommodation in Las Vegas with a range of restaurants and cocktail bars.
3. The Canal Hotel: An opulent Italian-themed resort with luxurious suite accommodation.

To book your trip to Las Vegas, you can visit the Margie's Travel website at www.margiestravel.com [doc1].

3.



Launched Workspace and configured

Microsoft Azure databricks

Search data, notebooks, recents, and more...

New

Workspace

Recents

Catalog

Workflows

Compute

Marketplace

SQL

SQL Editor

Queries

Dashboards

Genie

Alerts

Query History

SQL Warehouses

Data Engineering

Job Runs

Data Ingestion

Pipelines

Machine Learning

Compute > Simple form: OFF

Volodymyr Dibrova's Cluster

Configuration Notebooks (0) Libraries Event log Spark UI Driver logs Metrics

Policy

Unrestricted

Multi node Single node

Access mode Single user access

Dedicated (formerly: Single user) Volodymyr Dibrova

Performance

Databricks Runtime Version

15.4 LTS (includes Apache Spark 3.5.0, Scala 2.12)

Use Photon Acceleration

Node type

Standard_D3_v2 14 GB Memory, 4 Cores

Terminate after 20 minutes of inactivity

Tags

No custom tags

Installed required libraries

Microsoft Azure databricks

Search data, notebooks, recents, and more... CTRL + P

myDatabricks

Compute > Simple form: OFF

Volodymyr Dibrova's Cluster

Configuration Notebooks (0) Libraries Event log Spark UI Driver logs Metrics Apps Spark compute UI - Master

Filter Libraries

Status	Name	Type	Source
✓	numpy==2.1.0	PyPI	-
✓	requests==2.32.3	PyPI	-
✓	opensearch==1.42.0	PyPI	-
✓	elasticsearch==8.7.0	PyPI	-

Downloaded data files from GitHub into the file system used by my cluster.

Microsoft Azure databricks

Search data, notebooks, recents, and more... CTRL + P

myDatabricks

Untitled Notebook 2025-03-05 19:44:25 Python

File Edit View Run Help Last edit was 5 minutes ago

Run all Volodymyr Dibrova's Cluster Schedule Share

Free trial ends in 14 days. Upgrade to Premium in Azure Portal

```
bash
rm -r /dbfs/fine_tuning
mkdir /dbfs/fine_tuning
wget -O /dbfs/fine_tuning/training_set.jsonl https://github.com/MicrosoftLearning/mslearn-databricks/raw/main/data/training_set.jsonl
wget -O /dbfs/fine_tuning/validation_set.jsonl https://github.com/MicrosoftLearning/mslearn-databricks/raw/main/data/validation_set.jsonl

OK .. 100% 447K-0, 006s

2025-03-05 18:06:42 (447 KB/s) - '/dbfs/fine_tuning/training_set.jsonl' saved [2704/2704]

--2025-03-05 18:06:42-- https://github.com/MicrosoftLearning/mslearn-databricks/raw/main/data/validation_set.jsonl
Resolving github.com (github.com)... 148.82.112.3:443... connected.
HTTP request sent, awaiting response... 302 Found
Location: https://raw.githubusercontent.com/MicrosoftLearning/mslearn-databricks/main/data/validation_set.jsonl [following]
--2025-03-05 18:06:42-- https://raw.githubusercontent.com/MicrosoftLearning/mslearn-databricks/main/data/validation_set.jsonl
Resolving raw.githubusercontent.com (raw.githubusercontent.com)... 185.199.109.133, 185.199.110.133, 185.199.111.133, ...
Connecting to raw.githubusercontent.com (raw.githubusercontent.com)|185.199.109.133|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 2640 (2.6K) [text/plain]
Saving to: '/dbfs/fine_tuning/validation_set.jsonl'

OK .. 100% 7.05K-0s

2025-03-05 18:06:42 (7.05 KB/s) - '/dbfs/fine_tuning/validation_set.jsonl' saved [2640/2640]
```


Check tokens

The screenshot shows a Databricks notebook interface. At the top, there's a search bar and a 'CTRL + P' shortcut. The notebook title is 'Untitled Notebook 2025-03-05 19:44:25' with a Python language selector. A notification banner at the top states 'Free trial ends in 14 days. Upgrade to Premium in Azure Portal'. The code cell contains the following Python code:

```
import json
import tiktoken
import numpy as np

encoding = tiktoken.get_encoding("cl100k_base")

def num_tokens(messages):
    return sum(len(encoding.encode(m["content"])) for m in messages)

files = ['./dbfs/fine_tuning/training_set.jsonl', './dbfs/fine_tuning/validation_set.jsonl']
for file in files:
    with open(file, 'r', encoding='utf-8') as f:
        dataset = [json.loads(line) for line in f]

    tokens = [num_tokens(ex["messages"]) for ex in dataset]
    print(f"{file}: min={min(tokens)}, max={max(tokens)}, avg={np.mean(tokens)}")

/dbfs/fine_tuning/training_set.jsonl: min=32, max=47, avg=37.1
/dbfs/fine_tuning/validation_set.jsonl: min=28, max=50, avg=36.4
```

Below the code, there are instructions: '[Shift+Enter] to run and move to next cell', '[Ctrl+Shift+P] to open the command palette', and '[Esc H] to see all keyboard shortcuts'.

Check access to my azure ai : Success

The screenshot shows a Jupyter notebook with a Python code cell. The code imports the 'openai' library and sets up the client with the following parameters:

```
import openai

client = openai.AzureOpenAI(
    azure_endpoint="https://myai.openai.azure.com/",
    api_key="sk-12345678901234567890123456789012",
    api_version="2024-05-01-preview"
)

try:
    response = client.models.list()
    print(response)
except Exception as e:
    print(f"Anomalia niazmuvanna: {e}")
```

The output of the code is a large JSON array of model objects, indicating a successful connection to the Azure OpenAI API. The first few models listed are 'dall-e-3-0', 'dall-e-2-2-0', 'code-cushman-001', 'gpt-3.5-turbo-0613', and 'gpt-4-0125-preview'.

databricks

Untitled Notebook 2025-03-05 19:44:25 Python

Free trial ends in 14 days. Upgrade to Premium in Azure Portal

```
import json
import tiktoken
import numpy as np
from collections import defaultdict

encoding = tiktoken.get_encoding("cl100k_base")

def num_tokens_from_messages(messages, tokens_per_message=3, tokens_per_name=1):
    num_tokens = 0
    for message in messages:
        num_tokens += tokens_per_message
        for key, value in message.items():
            num_tokens += len(encoding.encode(value))
            if key == "name":
                num_tokens += tokens_per_name
    num_tokens += 3
    return num_tokens

def num_assistant_tokens_from_messages(messages):
    num_tokens = 0
    for message in messages:
        if message["role"] == "assistant":
            num_tokens += len(encoding.encode(message["content"]))
    return num_tokens

def print_distribution(values, name):
    print(f"##### Distribution of {name}:")
    print(f"min / max: {min(values)}, {max(values)}")
    print(f"mean / median: {np.mean(values)}, {np.median(values)}")

files = ['/dbfs/fine_tuning/training_set.jsonl', '/dbfs/fine_tuning/validation_set.jsonl']

for file in files:
    print(f"File: {file}")
    with open(file, 'r', encoding='utf-8') as f:
        dataset = [json.loads(line) for line in f]

    total_tokens = []
    assistant_tokens = []

    for ex in dataset:
        messages = ex.get("messages", [])
        total_tokens.append(num_tokens_from_messages(messages))
        assistant_tokens.append(num_assistant_tokens_from_messages(messages))

    print_distribution(total_tokens, "total tokens")
    print_distribution(assistant_tokens, "assistant tokens")
    print("*" * 75)
```

databricks

Untitled Notebook 2025-03-05 19:44:25 Python

```
files = ['/dbfs/fine_tuning/training_set.jsonl', '/dbfs/fine_tuning/validation_set.jsonl']

for file in files:
    print(f"File: {file}")
    with open(file, 'r', encoding='utf-8') as f:
        dataset = [json.loads(line) for line in f]

    total_tokens = []
    assistant_tokens = []

    for ex in dataset:
        messages = ex.get("messages", [])
        total_tokens.append(num_tokens_from_messages(messages))
        assistant_tokens.append(num_assistant_tokens_from_messages(messages))

    print_distribution(total_tokens, "total tokens")
    print_distribution(assistant_tokens, "assistant tokens")
    print("*" * 75)
```

File: /dbfs/fine_tuning/training_set.jsonl

```
##### Distribution of total tokens:
min / max: 47, 62
mean / median: 52.1, 50.5

##### Distribution of assistant tokens:
min / max: 13, 30
mean / median: 17.6, 15.5
*****
File: /dbfs/fine_tuning/validation_set.jsonl

##### Distribution of total tokens:
min / max: 43, 65
mean / median: 51.4, 49.0

##### Distribution of assistant tokens:
min / max: 8, 29
mean / median: 15.9, 13.5
*****
```

[Shift+Enter] to run and move to next cell
[Ctrl+Shift+P] to open the command palette
[F1] to open the help sidebar

Check json file

```
import os

files = ["/dbfs/fine_tuning/training_set.jsonl", "/dbfs/fine_tuning/validation_set.jsonl"]

for file in files:
    if os.path.exists(file):
        print(f"✅ file is found: {file}")
    else:
        print(f"❌ file is not found: {file}")
```

✅ file is found: /dbfs/fine_tuning/training_set.jsonl
✅ file is found: /dbfs/fine_tuning/validation_set.jsonl

[Shift+Enter] to run and move to next cell
[Ctrl+Shift+P] to open the command palette

I received error code 500 :

```
7
8 client = AzureOpenAI(
9     azure_endpoint=os.getenv("AZURE_OPENAI_ENDPOINT"),
10     api_key=os.getenv("AZURE_OPENAI_API_KEY"),
11     api_version="2024-05-01-preview"
12 )
13
14 training_file = client.files.create(file=open('/dbfs/fine_tuning/training_set.jsonl', "rb"), purpose="fine-tune").id
15 validation_file = client.files.create(file=open('/dbfs/fine_tuning/validation_set.jsonl', "rb"), purpose="fine-tune").id
16 print("Training File ID:", training_file)
17 print("Validation File ID:", validation_file)
18
19
```

❶ > InternalServerError: Error code: 500 - {'error': {'code': 'InternalFailure', 'message': 'Internal failure.'}}

File <command-4903765838980816>, line 14

```
6 os.environ["AZURE_OPENAI_ENDPOINT"] = "https://myai.openai.azure.com/" target="_blank" rel="noopener noreferrer">https://myai.openai.azure.com/</a></span><span>&quot;</span>
8 client = AzureOpenAI(
9     azure_endpoint=os.getenv("AZURE_OPENAI_ENDPOINT"),
10     api_key=os.getenv("AZURE_OPENAI_API_KEY"),
11     api_version="2024-05-01-preview"
12 )
--> 14 training_file = client.files.create(file=open('/dbfs/fine_tuning/training_set.jsonl', "rb"), purpose="fine-tune").id
15 validation_file = client.files.create(file=open('/dbfs/fine_tuning/validation_set.jsonl', "rb"), purpose="fine-tune").id
```